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### Policy

The U.S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be nor susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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### Relief of Postthoracotomy Pain

The control of pain following thoracic surgery is a problem of considerable magnitude. It is imperative that the patient breathe deeply and cough frequently to keep the lungs fully aerated and to prevent bronchial secretions, purulent material, and at times blood, from accumulating and causing atelectasis. If analgesics are withheld or given only in small amounts, pain tends to inhibit deep breathing and coughing. Analgesics in a sufficient amount to control the pain fully usually diminish the cough reflex and respiratory excursion, to permit the same result as occurs if analgesics are withheld, namely, atelectasis. Thus, a compromise is usually attempted, with the hope that sufficient analgesic can be given to control the pain without depression of respiratory volume or coughing. This balance is difficult to achieve. In the surgical treatment of pulmonary tuberculosis the problem becomes even more important than in other thoracic surgery, as the danger of dissemination of the disease through retained sputum is always present.

The value of intercostal nerve block in relieving pain of thoracic origin is common knowledge. However, with the usual local anesthetic (procaine), the duration of anesthesia is only a matter of a few hours, and the repeated injections necessary for prolonged anesthesia shortly become obnoxious to both the patient and the physician. Blades and Ford introduced a method of producing continuous intercostal blocks through the use of minute plastic catheters threaded down to the pertinent intercostal nerves, and through which procaine is administered every 3 hours. (See News Letter, Vol. 17, No. 12)

Several reports on the satisfactory performance of a new long-lasting local anesthetic solution, efocaine, for the relief of postoperative pain following various surgical procedures prompted a trial of it to induce intercostal nerve block for relief of pain following various thoracic operations.



In view of the variability of the pain threshold from one patient to another, as shown by Papper in a study of postoperative pain, it was decided to use patients requiring multiple operative procedures as controls. Even numbered patients with planned multiple procedures, such as routine thoracoplasty or tailored thoracoplasty following resection, received an efocaine block at the second operation, while odd numbered patients were blocked at the first and third operations (a third operation was performed in 6 cases). Thus, patients served as controls for themselves, a particularly satisfactory method of control, in view of this variability of the pain threshold. Neither the patients nor the ward nurses knew which patients received efocaine; the postoperative orders were precisely the same in either case.

Eighty-four patients having a single operative procedure (such as lobectomy, pneumonectomy, esophageal resection, ligation of patent ductus arteriosus, decortication) had an efocaine block induced during the procedure. Of these, 65 had a satisfactory result, as judged by the patient's analgesic requirements, early mobility, acquiescence when requested to cough, skin anesthesia, and general well being. The average morphine requirement for this group of patients was 17 mg. per 24 hours for the first 96 hours postoperatively. The other 19 patients were judged to have a less than satisfactory result; each patient in this classification received an average of 115 mg. of morphine in the first 96 hours, or 29 mg. per 24 hours.

Sixteen patients had at least 2 thoracic operations each, for a total of 38 operations. Efocaine intercostal block was induced on each patient during at least 1 procedure, for a total of 18 procedures. The daily requirement of morphine per patient per day, following the procedures accompanied by the intercostal block, was 18 mg. The average daily requirement of morphine for the control patients was 33 mg.

An area of skin anesthesia was obtained in every patient on whom efocaine was used. However, in the "unsatisfactory result" cases the area was often incomplete, being confined, for example, to an area of skin below or above the incision. In the successful cases, the anesthetic area included a band of skin 12 to 15 cm. wide centered on the incision.

The duration of skin anesthesia varied from 10 to 26 days, with an average of 15.2 days. Puderbach and Shaftel noted an average duration of anesthesia of 14.2 days, following efocaine intercostal block to relieve upper abdominal postoperative pain.

No complications in any way related to the use of efocaine have been observed. (Surg., Gynec. & Obst., Aug. 1953, W.R. Deaton, Jr. and H. H. Bradshaw)

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### Pregnancy and Healed Subacute Bacterial Endocarditis

One of the most remarkable therapeutic advances of the present decade is the successful treatment of subacute bacterial endocarditis with penicillin. Prior to the use of antibiotics, this disease was frequently fatal. Thus it was rarely found complicating pregnancy. At present, with the greatly improved prognosis, a new problem has arisen, namely, the management of pregnancy in cured patients.

To date, only scattered reports have appeared in the literature and there is no unanimity of opinion among cardiologists or obstetricians in regard to management. Because criteria for the care of these patients could not be based upon the limited experience of any one institution, a survey was undertaken of their management in the leading obstetrical centers throughout the country.

Questionnaires were sent to 300 hospitals, each with 2,000 or more deliveries per year. Replies were received from 102 of the institutions revealing a total of 113 cases of subacute bacterial endocarditis preceding or complicating pregnancy. These include the 12 cases previously reported in the American literature. Fifty-four percent of those who responded stated that no case of this type had been delivered at their institution. However, there is no doubt that there have been many more instances than are reported in this series. In addition, 7 cases were collected from the British literature. This report, therefore, is based on 120 cases, 85 following healed subacute bacterial endocarditis, and 35 complicated by and cured of this disease during pregnancy.

There were 78 primiparas, 33 multiparas, and in 9 the parity was not stated. Four cases terminated in spontaneous abortions and therapeutic abortion was performed in 14. One hundred and two cases went to viability with the loss of 3 infants, a viable fetal loss of 2.9%. There were 3 maternal deaths in the healed group with a rate of 3.5%, while the rate rose to 4.2% when subacute bacterial endocarditis occurred during pregnancy. The maternal mortality rate for the entire series was 6.6%.

Once the cure of subacute bacterial endocarditis has been achieved, the basic problem as far as pregnancy is concerned, reverts to the valvular abnormalities which pre-existed the infection and to the additional damage done during the healing process of the acute infection. In the majority of instances subacute bacterial endocarditis occurs on already damaged valves or at the site of congenital defects.

Pregnancy following healed subacute bacterial endocarditis is contraindicated for the first 6 months following clinical cure. During this period, lack of stabilization of the cardiac reserve results in an increased incidence of congestive failure and an increased maternal mortality rate. If pregnancy occurs during this phase, therapeutic abortion without tubal ligation is indicated and should be performed during the first trimester.



Healed subacute bacterial endocarditis of longer duration per se is not a contraindication to pregnancy. The advisability of childbearing is determined by a critical evaluation of the underlying cardiac lesion.

Pregnancy does not predispose to recurrence of the disease. The incidence of recurrence during pregnancy is similar to that noted in the healed, nonpregnant individual.

The treatment of subacute bacterial endocarditis is as successful in the pregnant as in the nonpregnant cardiac patient. Early diagnosis is the key to successful treatment.

The prenatal care and conduct of labor are similar to that in any patient with heart disease. Cesarean section should be performed only for obstetrical indications.

Routine intra- and post-partum use of antibiotics in all patients with heart disease is advocated to prevent the occurrence or recurrence of subacute bacterial endocarditis. (Am. J. Obst. & Gynec., Aug. 1953, P. Pedowitz and L. M. Hellman)

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### Pregnancy and Multiple Sclerosis

Multiple sclerosis is an acute or chronic steadily progressive or remittent disease of unknown cause, involving chiefly the white matter of the central nervous system.

The present study was undertaken in an attempt to determine the effect of multiple sclerosis on pregnancies; and the effect of pregnancies on multiple sclerosis among the patients with this disease admitted to the New York Lying-In Hospital. An attempt was also made to determine the efficacy of therapeutic abortions in altering or improving the subsequent course of the disease.

Twenty-two patients with multiple sclerosis and pregnancy are reported. In 17 pregnancy did not effect the disease. Five had the onset or an exacerbation during a pregnancy.

It is estimated that between 50,000 and 100,000 persons in the United States have multiple sclerosis. This represents, therefore, an important disease both medically and economically. If there will be, as is estimated, 4 million term and premature deliveries in the United States during the next year, the importance of attempting to determine the relationship of pregnancy to the disease becomes apparent.

More than half the patients in this series had the onset before any pregnancies, and almost two-thirds had exacerbations unrelated to pregnancies. It is difficult to establish pregnancy as the etiological agent in the onset or recurrence in these cases. In the 5 with the onset or recurrence during a particular pregnancy, 4 also had recurrence unrelated to pregnancy and 3



had later pregnancies without recurrence. The results of this study would indicate that the onset and the recrudescence which occur during pregnancy may not actually represent a cause-and-effect relationship, but may represent a purely chance relationship. It does not seem reasonable to consider pregnancy as the exciting factor in the onset of multiple sclerosis or the stimulant of the exacerbations of the disease, for as the author has shown, the onset or the exacerbations are not limited to pregnancy nor are the pregnancies in women with the condition always associated with either the onset or the exacerbations. Indeed, the disease is not limited to pregnant women or even to women, but occurs equally often in men.

The author has been unable to find that multiple sclerosis has any adverse effect on pregnancy. The results indicate that patients with this condition undergo completely normal pregnancies and deliveries with no increase in any obstetrical complications. The author does not agree that the labors are painless or that inhalation anesthesia is detrimental and he believes that the labors and deliveries may be conducted under the same regimen as the labors and deliveries of those patients without the disease. Furthermore, a patient with multiple sclerosis who becomes pregnant may anticipate as great a chance of having a healthy child as does any pregnant patient who does not have the disease. This study would indicate, therefore, that the diagnosis of multiple sclerosis is not a medical indication for a therapeutic abortion. In this survey 3 of the 4 patients whose pregnancies were interrupted continued to follow the natural course of the disease with subsequent remissions and exacerbations unrelated to pregnancy. The author believes, therefore, that nothing is to be gained from interrupting a pregnancy in a patient with multiple sclerosis, because the disease will have no effect on the pregnancy and the pregnancy will not affect the ultimate course of exacerbations and remissions which are so characteristic of this disease. (Am. J. Obst. & Gynec., July 1953, W. J. Sweeney)

### Pyrogram

Dr. A. B. Wallace, Reader in Plastic Surgery at the University of Edinburgh, has devised a tabular nomogram designed to be of aid in guiding the physician responsible for the treatment of burn patients. Some of the variables taken into account include the age and weight of the patient, the percentage of area of body burned, the urinary output, the amount of fluid intake by mouth and by intravenous administration, and the amount of morphine required for sedation. Considerable information is provided in a very compact and useful way. A diagram for estimating the extent of the burn by the "rules of 9" method is provided as well as suggested methods of procedure in treatment given in outline form. An example of the information pro-



vided for a specific case is as follows: a child aged 10, weighing 70 lbs., would have a satisfactory hourly urine output of 30 to 35 ml. if urine were produced. The proper sedative dose of morphine would be 10 mg. Fluid intake should include 1,500 ml. of glucose water by mouth each 24 hours, plus, if the patient has a 20% body area burned superficially, 1,360 ml. of fluid by the intravenous route. It is suggested that half of this should be plasma, one half saline, and of the total, one half should be given in the first 8 hours after burning and one half in the next 16 hours. Suggestions are made for inclusion of whole blood if the burns are deep, and for the procedure in the event oral fluids are refused, and so forth. Any guide or aid of this type is bound to have some limitations, but on the other hand, this Pyrogram presents a great deal of information in a very compact and concise manner and obviates errors in calculating fluid requirements. If one is prepared to accept the basic facts used to make the calculations and compile the data, the Pyrogram will prove an accurate and timesaving device. (Practitioner 170: 109 (1953) A. B. Wallace; abstracted in Technical Report ONRL-83-53, ONR, London)

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#### Cancer of the Larynx

Two hundred and thirty-five cases of proved cancer of the larynx observed at New Haven Hospital between 1921 and 1951 were studied.

Males outnumbered females in a ratio of 12:1. The prognosis differed for the two sexes; 50% of the women survived 5 years or more, whereas only 28% of the men lived so long. Age at onset of symptoms in 65% of the cases was between 50 and 70 years, with women tending to develop the disease at an earlier age than men. Thirteen percent of the patients had family histories of malignancy. Thirty-four percent admitted to excessive alcohol intake. Forty-three percent were known to smoke or chew to excess. Twenty-three percent of all patients were engaged in metal working occupations. Thirty percent had x-ray diagnoses of tuberculosis, about one-third of these having active lesions. Evidence of syphilitic infection was present in 6% of cases. The possible role of infection in carcinogenesis is discussed. Septal deviation with obstruction appeared in 31% of patients; its effect and that of mouth breathing on respiratory epithelium are considered. Hoarseness and cough in 81 and 43% of cases, respectively, were the most frequent presenting symptoms. Unilateral painless neck swelling was the first symptom in a surprisingly large number of cases, 6%. Forty-seven percent of patients sought medical care within 6 months of onset; 73%, within the first year. Fourteen percent of patients had a first biopsy which was negative for cancer. Forty percent of patients had laryngeal edema noted at the first examination. Ninety-five percent of lesions were epidermoid carcinoma. Twenty-seven percent of the female patients in this series had histologic types other

than epidermoid carcinoma, as compared with 4% of males. Eight percent of the patients had no treatment of any kind; 95% received therapy in some form. Thirty-one percent were treated by surgery, 48% by radiotherapy, and 21% by a combination of surgery and irradiation. The over-all 5-year survival rate in the cases in which treatment was given was 34.2%. Intra-laryngeal extirpation was performed in 4 cases, with three 5-year cures. Laryngofissure resulted in a 67% 5-year cure rate. Hemilaryngectomy produced a 75% 5-year survival in a small series of cases. The 5-year survival rate after laryngectomy ranged between 42 and 52%, depending upon whether or not additional therapy was required. The majority of patients on whom laryngectomy was successful had differentiated lesions involving one or both cords, with or without fixation, with extension to the subglottic space, ventricular bands, ventricle, epiglottis, or all of these. Results of neck dissection as an adjunct to other therapy were promising in a limited series of cases. Radiotherapy alone yielded 22.5% 5-year survival. The relationship of anatomical location to prognosis is discussed. The development of edema during irradiation had no adverse effect on the cure rate. The pre-operative extraction of carious teeth and other dental prophylaxis are important in the prevention of postoperative complications. (Arch. Otolaryng., July 1953, J. A. Kirchner and J. S. Malkin)

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#### Carcinoma of Body and Tail of Pancreas

This study is concerned with the clinical and pathologic findings in 58 cases of carcinoma of the body and/or tail of the pancreas. Tumors involving the whole gland, in which there was no evidence as to the site of origin of the neoplastic process, are excluded, but the series includes 5 cases in which the growth, clearly having arisen in the body, had infiltrated the head. The cases were discovered on scrutiny of the records of all medical and surgical admissions to the Royal Victoria Infirmary, Newcastle upon Tyne, during the 20-year period 1932-1951. The number of growths in the head of the organ occurring during the same period was noted, but these cases were not subjected to detailed analysis. The diagnosis in the cases of growth in the body or tail was confirmed at autopsy in 21 cases and at laparotomy in the remainder; additional confirmation was usually obtained in the surgical cases by biopsy. When no biopsy was taken the intra-abdominal findings left no doubt in the mind of the surgeon that there was a primary neoplasm in the pancreas. In several other cases explored operatively during the same period similar growths were probably present, but in view of Ingelfinger's comment that diagnosis by laparotomy is occasionally unsatisfactory, all patients in whom there was any doubt of the diagnosis have been excluded from consideration.



The extreme variability of the clinical picture in the cases reported and the comparative inutility of investigational methods readily explain the low proportion of accurate clinical diagnoses reached in cases of carcinoma of the body and/or tail of the pancreas. It is also clear that in a proportion of cases clinical diagnosis will never be possible before the tumor has spread so widely as to be inoperable. Nevertheless, the only hope of successful treatment lies in early diagnosis, and it is suggested that certain clinical pointers exist which may raise the suspicion of neoplasia in this situation.

Abdominal pain is characteristically intermittent and somewhat dull in character, though it is occasionally severe; it is usually epigastric in location, and frequently radiates to the back but not often to the left side. It is often worse at night but does not show the characteristic features of peptic ulcer pain. The authors have not found it to alter significantly with change of position. Quite often it is described in glowing, exaggerated terms, and this may suggest a functional basis, particularly if associated overt anxiety and depression are present; in any such case the possibility of pancreatic carcinoma should be kept in mind, especially if loss of weight has occurred. Anorexia and severe weight loss are often early symptoms, but even more characteristic is a subjective feeling of weakness or exhaustion, rarely met with so early in the course of other intra-abdominal malignant disease. Vomiting is not prominent, but obstinate constipation is frequent; gastrointestinal bleeding occurs significantly often but is usually of late onset, due to infiltration of the gastrointestinal tract; hence this symptom cannot be considered useful in early recognition of the disease. Jaundice, in contradistinction to cases with growths in the head of the organ, is uncommon and also occurs late, indicating metastasis, as does ascites. Anemia appears to be of little significance, while the presence of an abdominal mass usually suggests that the disease has progressed beyond effective aid. Most important, however, is the occurrence of thromboembolic manifestations, particularly if multiple; the combination of any of the more vague symptoms and signs listed above should lead to a careful search for evidence of thrombosis which, once found, may suggest pancreatic neoplasia as the source of symptoms. Under such circumstances, too, a battery of investigations, including examination of the blood and estimation of the urinary diastase, serum amylase, and blood lipase, as well as the secretin test, may be indicated. More important still, the stools should be carefully examined for free or excess fat or undigested protein, and a barium meal examination should be performed with particular attention to the position and shape of the stomach and the relation of its position to the duodenum. However, even though each of these investigations is occasionally helpful, none is infallible, and certain diagnosis can be achieved only by laparotomy. This is the next logical step, and even if occasional unnecessary operations are performed, this will be justifiable if a proportion of patients with early pancreatic carcinoma are saved.

It cannot be suggested that the features outlined will allow a correct diagnosis to be reached in every case. Many of the authors' cases were beyond surgery when their first symptoms (dysphagia, or lumps in the skin, for instance) appeared. However, it is probable that appreciation of the occasional significance of weakness, exhaustion, thrombotic manifestations, and abdominal pain of the type described may lead to earlier diagnosis and possibly effective surgery. (Ann. Int. Med., July 1953, C. Strang and J. N. Walton, Newcastle upon Tyne, England)

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### Treatment of Mediastinal Foreign Bodies

Metallic foreign bodies in and around the heart and great vessels of the chest present a problem, not so much of diagnosis, as of treatment.

This is not a report on the early treatment of traumatic wounds of the mediastinum, but rather a discussion of the indications for removal of metallic foreign bodies after their implantation, and after the patient has recovered from his initial injury. This discussion is based upon a series of 32 cases of mediastinal foreign bodies, all missiles of war, in or near the heart and great vessels, as seen at the Osaka Army Hospital from June 1951 through July 1952. It represents 7.3% of all cases whose principal injury was to the chest admitted on this service. The total number of traumatic chest cases admitted during this period was 437, not including minor chest wall injuries or those who had more severe concurrent injury. No patient was excluded for any reason. Sixty percent of these cases were completely asymptomatic and one-half of those with symptoms had minimal symptoms referable usually to pulmonary pathologic changes. In this series, 74% of the patients were seen within 10 days after injury. Their general physical condition was good or could be corrected with whole blood, antibiotics, debridement, and closure of superficial wounds, et cetera. They were all combat soldiers injured in the line of duty on the Korean front, with an average age of 23 years, and were in the best of physical condition prior to injury.

In the Korean conflict, there has been a high incidence of hand grenade and mortar shell wounds of which two-thirds of these cases are examples. The hand grenade and mortar are ideal weapons for wounds such as these, because of the multiplicity of fragments and their rapidly decreasing velocity. Wounds caused by small arms fire were seen in only 4 cases, in 3 of which the bullets had been fired from some distance and were "spent" at the time of impact. The missiles had an average size of 1.2 cm. in their greatest diameter; the largest of those removed was 4 cm., the smallest 0.3 cm. Twenty-nine or 90.6% of these cases were operated upon without mortality. Of the 3 nonoperated cases, 1 died, 1 was sent to the United States because



of bundle branch block due to severance of the bundle of Hiss, and the third was returned to duty without operation. It has been the policy of this service to remove any foreign body 0.8 to 1 cm. or more in the greatest diameter, from anywhere in the chest. This policy was altered in favor of removing foreign bodies of much smaller size when the foreign body was thought to be near or in the mediastinum. Because 84.4% of these patients were relatively asymptomatic, it is rather surprising to conclude postoperatively that only 1 (3%) would have been just as well off without operation.

There has been some disagreement in the literature about indications for removal of metallic foreign bodies from the mediastinum. Since Harken's authoritative reports on the removal of foreign bodies near the great vessels and heart, much discussion has arisen as to indications for removal. Harken's indications are: (1) To prevent embolism of the foreign bodies or associated thrombus; (2) to reduce the danger of bacterial endocarditis; (3) to prevent recurrent pericardial effusions; and (4) to diminish the incidence of myocardial damage.

In this small series, almost all of these dangers were present. Bacterial endocarditis was not seen and thrombophlebitis was at a minimum, possibly because of the high dosage of antibiotics used. Schaefer and Satinsky have enumerated the dangers of permitting a foreign body to remain in the myocardium: (1) Cardiac rupture, especially the rupturing of a cardiac aneurysm; (2) migration into the adjacent cavity with embolism formation or interference of the function of the chamber; and (3) injury to a coronary vessel.

Fritz, Newman, Jampolis, and Adams from the University of Chicago, whose conclusions were based on experiments using 62 dogs, state: "It seems reasonable to conclude that the majority of foreign bodies retained in or about the heart, so long as they are not producing symptoms or signs of cardiac dysfunction, may be permitted to remain undisturbed. We do not feel that it is necessary to remove foreign bodies for prophylactic purposes."

It is with this controversy in mind that the present discussion is brought up. In this series, the treatment of which has been influenced by surgical literature since the last war, it became increasingly evident that a more radical attitude was more appropriate for this condition. Twenty-seven patients (84.4%) were relatively asymptomatic except for the known presence of a foreign body, and at the time of operation the foreign bodies were shown to be either in an extremely hazardous position or accompanied by actual abscess formation. Of the entire group, only 1 foreign body was seen to be in an innocuous position and would have caused no more symptoms than a retained pulmonary foreign body, if one considers this latter position to be innocuous. Although this series of cases is relatively small, it is believed it warrants the revival of the argument in favor of a more radical approach to these foreign bodies. (Ann. Surg., July 1953, R. J. Simpson)

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### Dextran in Control of Shock

The authors' clinical evaluation of dextran was carried out at a Mobile Army Surgical Hospital which received casualties from approximately one-third of the Korean battle front. The wounded included Americans, Koreans, Canadians, Welshmen, Puerto Ricans, Filipinos, Dutchmen, and an occasional Chinese prisoner. They varied in age from 18 to 34 years, but the vast majority were between 19 and 23.

Dextran was given to 60 wounded men. The patients selected for study included those who were in obvious shock and, in a few instances, those who had impending shock. On admission to the mobile Army surgical hospital each case was evaluated in terms of the extent of shock and the type, number, and location of the wounds. In 6 cases an infusion of dextrose solution was sufficient, temporarily, to control the shock. In many of these patients the blood pressure was in the low level of the normal range. However, their skin was ash gray, and apprehension was evident. The response of these patients to dextrose solution would support Ravdin's contention that "crystalloids carefully chosen and wisely administered might save lives by extending the availability of plasma and plasma extenders." These 6 patients eventually required dextran during surgical debridement of their wounds.

In the majority of patients who were treated with dextran, the wounds were caused by mines, grenades, and shell or mortar fire. These patients had multiple, traumatizing, shell-fragment wounds which were often complicated by fractures and large hematomas. Only 4 patients who had simple gunshot wounds received dextran, and in all of these the missile had injured a vital structure.

There were no recognizable reactions, either immediate or delayed, when dextran was used alone or in combination with other fluids.

The postoperative period, in nearly all cases, was characterized by a clinical course which was entirely satisfactory. Stable normal blood pressures and low hematocrit levels indicated continued expansion of the fluid component of the blood volume after the administration of dextran.

All patients had an adequate daily urinary output (at least 1,000 cc.). Frequently in the first 12 hours, the urinary specific gravity was above 1.040, and in 2 instances it was 1.075 and 1.080. These high levels were the result of the renal excretion of the smaller dextran molecules. After 24 hours, the specific gravity of the urine approached normal levels.

In none of the casualties who received dextran with or without dextrose solution was there any evidence of albuminuria. It is interesting to note that in a number of patients who received whole blood or its derivatives considerable albuminuria was evident during the recovery phase.

Three casualties who had received dextran died while in the Mobile Army Surgical Hospital. Autopsies were performed in each case. In neither the gross nor the microscopic findings was there evidence which would incriminate



dextran as the cause of death or as producing harmful changes in the organs or tissues. (Arch. Surg., June 1953, Col. W. H. Amspacher, MC, USA and A. R. Curreri)

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### Iproniazid in Bone and Joint Tuberculosis

Iproniazid, after having been used for a year in experimental work, is still a restricted drug as far as general sale and distribution are concerned. Like any chemical effective in the treatment of disease, it can and frequently does cause toxic symptoms, some of which may be severe. Complete knowledge as to benefits arising from its use, as well as toxicities, both immediate and delayed, is not available. Much more time must elapse before there is certainty as to effective dosage and a means of avoiding toxicity. Isoniazid as contrasted with iproniazid has been reported as showing a lesser number of toxic symptoms and a greater range of safe dosage. The authors believe that this may be true as to minor toxic symptoms, but not as to the major ones (liver damage and psychosis). They feel certain that isoniazid has a much less rapid and specific effect than iproniazid where bone and joint lesions are concerned. Further planned study of the comparative action of these two drugs, carried on without bias, is essential. Discarding their impressions of the past, the authors plan, in the immediate future, to run a contrasting series of 10 patients treated with isoniazid. With the experience already gained with iproniazid, a much fairer evaluation of the comparative action of isoniazid can be obtained.

The present experiment reports upon the use of iproniazid on 66 patients with tuberculosis of bones and joints. Among these patients there were 98 tubercular lesions; 45 of these healed, 37 improved, and 16 are unimproved. Included are a few tubercular lesions not involving the osseous system, but exclusive of pulmonary tuberculosis (skin, peritoneum, meninges, et cetera). Four of these patients have been under continuous medication with iproniazid since November 1951. No adverse findings have resulted from this prolonged medication when dosage has been held within proper limits. No cumulative effect was noted.

Of the 66 patients, the authors were able positively to prove tuberculosis in 47. In 7 the attempt to prove the presence of Mycobacterium tuberculosis failed. Twelve were admitted with diagnoses of tuberculosis, confirmed by other hospitals but not confirmed by the authors, because their lesions were closed and tissue was never obtained.

The ages ranged from 6 months to 80 years; a third of the group, however, were between the ages of 40 and 50 years. Seven patients were 6 years of age or under; these included 3 who were 6 months, 15 months, and 17 months of age, respectively. Forty were male and twenty-six were female.



The study began in November 1951 and, for the purposes of this article, was terminated January 1, 1953. Much of the statistical material included in this article is basic, and the conclusions reached should be fairly stable. The clinical status of patients under treatment, however, is by no means stable. Many unhealed lesions are rapidly healing. It is probable that in some patients recorded as having healed lesions, the same lesions will become reactivated, fresh lesions will develop, or the disease will continue with complications initiated by the original tuberculous process--mixed infections, deformities, and paralyses. In regard to laboratory findings, dosage, development of benefits or toxicity, reaction to anesthesia or pre-operative medication, and complications due to operative procedures, the report is fairly conclusive, and no great change is to be expected. In regard to the permanence of recovery of patients, tissue-culture studies, nitrogen balance, calcium and phosphorus balance, bone-ash determination, roentgenographic changes, use in combination with other drugs (such as streptomycin), the influence of vitamin therapy or dietary changes (such as salt reduction and high-protein diet), control of withdrawal of medication, and development of late and still unrecognized toxicities, new findings will occur and new conclusions will have to be drawn.

Five patients died while under treatment with iproniazid. None died with evidence of iproniazid toxicity. One patient succumbed in 4 days, overwhelmed by tuberculosis before any influence of the drug could be noted. Another patient, who had been on the drug only 5 days, died of a ruptured aorta eroded by a dissecting abscess. One patient died after 47 days with paraplegia; another patient died in a similar condition in 90 days. The fifth patient died in 90 days with 11 severe tuberculous bone and joint lesions, massive dehydration, and loss of electrolyte balance, despite the fact that several of the lesions had healed and cultures for the tuberculous organism had become negative.

For the present, the authors believe iproniazid to be the drug of choice in the treatment of tuberculous bone and joint lesions. It has proved of great value in patients not responding satisfactorily to preceding antibiotic therapy. (J. Bone & Joint Surg., July 1953, D.M. Bosworth, H.A. Wright, J. W. Fielding, and H. J. Wilson, Jr.)

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#### Change of Address

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The Failure of Antibiotic Therapy in  
Infectious Mononucleosis

Infectious mononucleosis has been characterized as a protean disease of childhood and young adult life. Its extremely varied course has led observers to attribute beneficial effect to many therapeutic agents, all of which have eventually proved valueless. Recently several investigators have reported the antibiotic agents, aureomycin and chloramphenicol, to be effective in altering the course of infectious mononucleosis, although other workers have concluded that these drugs are ineffective. Because of the obvious conflict between these views, the present study was undertaken. The results of this evaluation of 78 cases of infectious mononucleosis seem to demonstrate an unaltered natural progression of the disease toward organ involvement and either prolonged convalescence or rapid recovery, regardless of the introduction of aureomycin, chloramphenicol, or placebo.

The case material used in the study comprises 78 patients admitted to the University Hospitals of Cleveland and the Contagious Division, Cleveland City Hospital, between January 1, 1948 and June 1, 1951. The material is segregated into five groups.

I. Patients treated with aureomycin but not part of the controlled study: 21 cases (1948-1951).

II. Patients treated with chloramphenicol: 14 cases (1949-1951).

III. Patients treated with aureomycin as part of the controlled study: 11 cases (1950-1951).

IV. Patients treated with simulated aureomycin placebo as part of the controlled study: 10 cases (1950-1951).

V. Patients treated symptomatically or with penicillin: 22 cases (1948-1949).

It appears from this study that neither aureomycin or chloramphenicol alters the course of infectious mononucleosis and that these drugs should be relegated to the same category of ineffectiveness into which all other agents have eventually been placed. (Am. J. M. Sc., July 1953, Maj. S. H. Walker, MC, USA)

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Focal Cirrhosis of the Liver and Hamartoma

Focal or solitary nodular masses are occasionally observed in human livers that show no other significant pathological changes. These include metastatic neoplasms, an occasional primary hepatic-cell carcinoma, focal subcapsular hyperplasia of bile ducts, hemangiomas, granulomas, and adrenal rests. In addition there is the lesion that has been reported under



a variety of names such as adenoma, hamartoma, benign hepatoma, solitary hyperplastic nodule, and focal cirrhosis. This lesion occurs in both sexes and at any age. It is usually solitary but may be multiple and varies in size from a diameter of a few millimeters to several centimeters. It is seen by the surgeon when its size is great enough to cause a palpable abdominal mass. More frequently it does not cause the patient any disturbance and occurs as an incidental finding at laparotomy or the post-mortem examination, in which cases it must be distinguished from metastatic cancer and primary carcinoma of the liver. Despite the multiplicity of terms that have been used to denote this entity in the literature, the pathological descriptions, photographs, and clinical behavior of the lesion have been strikingly similar. The present knowledge of the subject is based largely on isolated case reports. No investigations of the problem have included a sufficient number of cases to justify any conclusions regarding histogenesis.

This article is based on a study of 34 examples of this entity that were found at necropsies performed at the Mayo Clinic. These cases not only provided ample material for the investigation of the fully developed phases of the lesion but also afforded the opportunity to observe the earliest stages of its development. This study was undertaken in an attempt to follow the development of the lesion in question and possibly to elicit information of value in understanding its histogenesis, classification, and possible relationship to primary hepatic-cell carcinoma occurring in the absence of generalized cirrhosis.

In the 34 cases were 40 nodular lesions. Thirty-eight of them were identical in appearance to, though generally smaller than, those described in the literature as hamartomas or benign neoplasms. The other 2 were true adenomas of a homogeneous cell type.

These localized nodules were single or multiple, generally subcapsular, and most frequently found in the right lobe of the liver. They were associated with hemangiomas of the liver in 20.6% of cases and in several cases with other neoplasms or congenital abnormalities.

Grossly and histologically, these nodular masses are identical to a focal area of cirrhosis including such features as active hepatitis, infiltration with fat, alcoholic hyalin, proliferation of bile ducts, and fibrosis. In tracing the development of the lesion from the very small nodules encountered in the series, the essential characteristic is the nodule of regeneration.

The reasons for rejecting a neoplastic or hamartomatous concept of this entity are discussed. The possibility that focal cirrhosis may develop in an area with an aberrant blood supply or bile-duct malformation is considered, though such evidence is not conclusive from this study.

That some primary carcinomas of the liver apparently occurring in the absence of generalized cirrhosis might arise from a localized cirrhosis



is probable. However, the authors' study of 4 such cases, while presenting similarities in gross architecture of the carcinomas, provided suggestive histological evidence of such a relationship in only 1 case.

Attention is drawn to two factors of surgical importance, namely, that the small nodules may be mistaken for metastatic cancer at laparotomy, and that, because most of the lesions lack a true capsule, removal of the nodular mass by shelling it out may leave nodules of regeneration behind. (Cancer, July 1953, E. J. Benz and A. H. Baggenstoss)

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### X-ray Exposure and Lens Opacities

The 40 patients on whom this report is based were irradiated for various reasons. Some had been given the radiation to the eye as part of the effective treatment of lymphomas or basal-cell carcinoma of the ocular adnexa. For these patients the radiation was from a 200 or a 1,200 kv. source, and the amount was determined with the accuracy usual in modern x-ray therapy. Because the treatment was given directly through the eye, the air dose was a reliable indication of the amount of radiation received by the lens.

In another group of patients the eye was irradiated incidentally in the treatment of various dermatoses. For the patients included in this report, shielding of the eye was omitted either because use of the shield was impracticable or because the amount of radiation reaching the eye was thought to be of no consequence. The eye was not centered in the beam during these exposures, and the x-ray energy was only 100 kv. To estimate the amount of radiation which had reached the eye during these exposures, a Victoreen meter was embedded in wax and placed in the orbit of a phantom skull. Measurements were then made during irradiation carried out in a manner similar to that which had been used in the treatment of patients.

In the group of patients with dermatoses there was a degree of selectivity in that all the patients were young adults and the majority were females.

Observation for lens changes were made with the ophthalmoscope or with the slit-lamp biomicroscope. No patients were included who had received the radiation less than 1 year previously, and for most patients the observation period was several years. The criterion for attributing a lens change to radiation was the finding of the morphologic changes which have been described as characteristic of irradiation; in the tumor cases a further criterion was the absence of the changes in the opposite eye, which was not exposed to appreciable radiation. All patients for whom there was any doubt in the authors' minds as to the validity of the observations or the amount of radiation received were eliminated from the series, and no observations were included on patients who had received more than 3,000 r to the eyes.



Lens opacities were not found in the present series of patients who had received 400 r (energies of 100 kv.) or less to the eye. Lens opacities of definitely radiation type were found in 1 of 3 patients who had received 600 r, in the 1 patient who had received 800 r, and in the 1 who had received 1,000 r. The time of onset of lens changes after the irradiation in these 3 patients was 2-1/2 years for the first, between 1-1/2 and 4-1/2 years for the second, and some time less than 10 years for the third. In the 2 patients who had received 2,400 r, mature cataracts had developed 1 year 4 months and 3 years, respectively, after the irradiation.

While the threshold dose for the production of lens opacities with the energies ordinarily employed (100 to 200 kv.) appears to be of the order of 600 r, more observations are needed in the long-range follow-up of patients whose eyes have been exposed to x-rays in the dosage level of 400 to 1,000 r. (Arch. Ophth., July 1953, D. G. Cogan and K. K. Dreisler)

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#### Treatment of Combined Cataract and Glaucoma

One of the most serious problems for the ophthalmic surgeon is the complication of cataract with glaucoma.

The restoration of sight and the control of tension in cases of both cataract and glaucoma are rarely achieved with a single operation. This article analyzes present-day methods of handling both cataract and glaucoma in the same eye.

Whenever cataract and glaucoma, of whatever type of combination, occur in one eye the prognosis is always more grave than if a single disease were present. In whatever combination, these two entities always lead to earlier surgery than when either condition is present separately. The course is invariably poor if the correct and complete diagnosis is not made early, and sometimes this condition is not successfully treated even when the diagnosis is correct and the operations well done.

Complications in addition to the ocular problem are to be expected in this group of patients, most of whom are in the 70-year age group. The determination of the type of surgery rests largely on the over-all picture.

As long as there is hope of salvaging usable vision, to declare even the most serious cases as inoperable does the patient a grave injustice. In one of the author's cases the single procedure was done in place of enucleation with a return of vision to 20/80.

Too many elderly people are content to finish their days in semiblindness because they or their relatives fear surgery. Many elderly people fear even one operation, and yet the conventional treatment for cataract with glaucoma often requires at least two operations on each eye. When it is explained to the patient that four or more operations offer the only chance



of restoring sight in both eyes, it is no wonder that some of them reject treatment, and let the condition go on to blindness or enucleation.

Other patients fight gamely along as far as their financial and physical powers allow. How many succumb to heart disease, cerebral vascular accidents, or other terminal illnesses during the long operative and convalescent period? If 4 operations can be done on an elderly patient in less than 2 years (6 months apart) average progress is being maintained.

There are two categories into which all cataract and glaucoma patients may be placed: (1) Those patients in one's own practice in whom the diagnosis is made early and in whom, perhaps, miotic therapy has been used for a long period of time. (2) Those patients who are referred to the surgeon when they are in the late stages of the disease, in whom often the glaucoma went unrecognized for a long period. Perhaps in such cases, one eye is blind and the other seriously affected.

Many of these patients, having been told of the cataracts, had expected vision to fail gradually until time for operation, but they had never known they had glaucoma because it had never been diagnosed.

The choice of surgical procedure depends on: (1) State of patient's health, (2) stage of the disease, (3) allowable time or number of operations, the surgeon estimates the patient can stand, and (4) vision available during the surgical period.

If an early diagnosis has been made and plans for the protection of vision in one eye during the surgical period have been formulated, the surgeon may take as much time as he wishes (or has planned) and use as many operations as he feels are indicated.

If there has been a late or mistaken diagnosis of glaucoma, the surgeon must try to help the patient out of a serious predicament and save as much vision as possible. It is here that the conventional multiple operation schedule is less advantageous than one radical operation.

Some eyes (and patients) will stand the "double hazard" of a single radical operation, combining cataract extraction and a filtering operation for glaucoma, better than the multiple hazards of several operations.

A combined procedure for the relief of glaucoma with cataract was first used by the author in patients who were obviously unable to stand multiple operations. One of the first cases was that of an elderly crippled woman in whom an iridectomy had been performed for acute glaucoma. A few months later the cataract had matured and the glaucoma recurred.

Rather than subject her to cataract extraction alone, and possibly later more surgery for the glaucoma, the combined operation of cataract extraction with iridencleisis was performed. It was successful; the tension remained controlled for many years and the vision was restored without further surgery. This result led to further use of the combined procedure in complicated cases.

The primary indications for choosing the single operation for both cataract and glaucoma are (1) to shorten the time required for restoration



of vision and control of tension, and (2) to reduce the number of surgical procedures. Radical surgery often succeeds in cases in which less extensive procedures fail. (Am. J. Ophth., Part I, July 1953, H. L. Birge)

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### Family Outbreaks of Infectious Hepatitis

Although the epidemiology of infectious hepatitis has been extensively studied in institutional outbreaks, the incidence and mode of transmission of the disease in families in civilian life has received scant attention. Pickles, Probert, Newman, and Kunkel have reported outbreaks among members of single families and their immediate contacts. Ford, in a study involving 300 cases in a civilian epidemic, found that 17% of the households had multiple cases of infectious hepatitis.

Stokes and Neefe first demonstrated the value of gamma globulin prepared from pooled human plasma in the prevention or modification of infectious hepatitis in a group of persons exposed in a severe outbreak of the disease in a summer camp. The effectiveness of gamma globulin was subsequently confirmed in epidemics involving the inmates of a mental institution and large numbers of military personnel in World War II.

Sporadic cases of infectious hepatitis in the greater Boston area have provided an opportunity to study the incidence of multiple cases occurring within families and to determine the value of gamma globulin in the control of household contacts.

From this study it is obvious that the exposure of children to hepatitis within family groups results in surprisingly high incidence of the disease, that gamma globulin is extremely effective in preventing the disease, and that the adults involved in these outbreaks appear to have a relatively high degree of immunity.

On questioning the parents, it soon became apparent that isolation techniques were unsatisfactory and impractical within the average home. When there were other children in the house, it proved to be almost impossible to prevent intimate contact between the patient and other children. Separate dishes and silverware were often accidentally mixed with those used by the rest of the family. In only one household was it possible for the patient to have a separate bathroom. In all others, the patient either used the same toilet as other members of the family, or used a bedpan. The stools from the bedpan were invariably emptied into the same toilet used by the rest of the family.

It appears that prophylaxis with gamma globulin is the only effective method known of preventing the spread of infectious hepatitis through family groups. The present study indicates that it is as useful in civilian life as in institutional and military outbreaks. It must be given early and at least



5 to 7 days before the onset of jaundice to be effective. The proper dosage remains to be determined. Further studies in progress suggest that 0.01 cc. of gamma globulin per pound of body weight is highly effective.

Whether every child exposed to infectious hepatitis within a family group should be given gamma globulin remains to be determined. In recent years, increasing evidence has accumulated that infectious hepatitis in childhood is not necessarily a benign disease. Hsia has found 4 children with chronic hepatitis and cirrhosis in a follow-up study of 30 children with infectious hepatitis. Drake has reported the development of cirrhosis and ascites in 2 children after apparently complete recovery from infectious hepatitis. On the other hand, the condition appears to be relatively more benign in children than in adults, and complete prevention during childhood may be unwise. Stokes and Drake have suggested that the disease may be prevented by administration of gamma globulin but that a mild inapparent infection may confer lasting immunity very much as modified measles does. However, this may only be true of children in institutions where the disease is endemic and exposure to the virus is constant so that infection may occur as the passive immunity conferred by gamma globulin wanes. There is obviously need for further studies on gamma globulin dosage in this disease to determine the extent to which small doses will permit the development of modified hepatitis.

Gamma globulin is definitely indicated in sick children exposed to hepatitis. This is especially true of children who are debilitated by chronic digestive and nutritional disturbances. In all other cases the material may be given at the discretion of the attending physician with the knowledge that it will be effective in preventing the spread of the disease within the family. Only future work on the long-term effects of infectious hepatitis in children may determine whether or not the disease should be prevented in childhood. (New England J. Med., July 9, 1953, B. F. Brooks, D. Yi-Yung Hsia, and S. S. Gellis)

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#### Primary Myocardial Disease in Infancy and Childhood

Rheumatic heart disease and congenital heart disease account for the vast majority of cardiac disorders in infancy and childhood. Within the past few years, a number of patients have been seen at the Children's Medical Center, Boston, with severe heart disease of a type which could not be fitted into either of the two groups mentioned. They all had the following features in common: (1) cardiomegaly; (2) absence of significant murmurs; (3) electrocardiographic abnormalities; and (4) normal blood pressure.



These children did not appear to have rheumatic heart disease because of their tender age and the absence of the major and minor manifestations of rheumatic fever. Congenital heart disease in the conventional sense (i. e., anomalies of the great vessels, valves, and septa) was excluded by the absence of murmurs, abnormal blood pressure, or evidence of shunts in either direction. Paroxysmal auricular tachycardia was excluded by the electrocardiographic finding of a sinus pacemaker and the persistence of cardiomegaly. Pericarditis was considered unlikely in the absence of electrocardiographic, roentgenologic, or clinical evidence of this condition. Furthermore, the course of the disease in these patients, as well as their response to treatment, did not suggest pericarditis.

The clinical picture presented by this group, plus autopsy experience on some of these patients, led the authors to believe that this syndrome was a manifestation of primary disease of the myocardium. No patient was included in this group who was known to have any of the communicable diseases (diphtheria, poliomyelitis, et cetera) or diseases of the central nervous system (Friedreich's ataxia, et cetera) which may be associated with a myocarditis. Four patients are included, however, in whom a differentiation between "primary myocardial disease" and myocarditis secondary to pneumonitis was practically impossible. These four patients had physical findings of rales and harsh breath sounds with chest films equally suggestive of inflammation or congestion.

The purpose of this study was to emphasize a clinical syndrome not generally well recognized, to stress its relative frequency, to review the literature on the subject, and to delineate its origin, course, and treatment.

Forty-five patients with the clinical picture of myocardial disease as defined constitute the material for this study. Twenty-six of these died and came to autopsy. Both pathological and clinical data are available on this group. Detailed clinical data are available on the surviving 19 patients.

In spite of the fact that the five pathological entities underlying this clinical syndrome of "primary myocardial disease" are difficult and often impossible to distinguish in the living patient, certain clinical features of differential value became apparent from this study, as well as from a perusal of the literature.

The five pathological entities discussed are: glycogen-storage disease of the heart, aberrant left coronary artery, medial necrosis of the coronary arteries, idiopathic myocarditis, and subendocardial sclerosis.

The data indicate that five pathologically distinct entities may present an almost identical clinical syndrome. Regardless of cause, patients with this clinical picture consistently showed marked generalized cardiomegaly by x-ray and in the vast majority, left ventricular hypertrophy and T-wave changes of myocardial damage were found in their electrocardiograms.

These cases may be divided into two subdivisions. One group includes glycogen-storage disease of the heart, aberrant left coronary artery, and medial necrosis of the coronary arteries. These are rare conditions which



are usually seen in infants under 6 months of age and in which congestive heart failure is uncommon. Idiopathic myocarditis and subendocardial sclerosis constitute the second, and much larger, group. Here the age at onset of symptoms is frequently beyond 6 months, and congestive failure is usually present and often severe. The first group is not amenable to treatment; the second frequently responds to digitalization. Such a division is admittedly not sharp, and there is considerable overlap from one group to the other. (Am. J. Dis. Child., July 1953, H. D. Rosenbaum, A. S. Nadas, and E. B. D. Neuhauser)

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### Cleidocranial Dysostosis

Although scattered cases of cleidocranial dysostosis were reported early in the latter half of the nineteenth century, the condition was first established as a clinical and pathological entity in 1898 by Marie and Sainton. On the basis of their study of 4 cases, they stressed as cardinal features of the disease its hereditary transmission, hypoplasia of the clavicles, increase in the transverse diameter of the skull, and delay in ossification of the fontanelles. They gave the abnormality its name of "cleidocranial dysostosis." In the following year Terry described a female skeleton which, in addition to the pathognomonic changes in the skull and clavicles, showed faulty eruption of the teeth, scoliosis, and poorly ossified pubic and ischial bones.

Patients with cleidocranial dysostosis are usually of small stature. The cranium is disproportionately large, with prominent frontal and parietal bosses. The face is small, the eyes widely spaced, and the nose depressed at the bridge. The chest may show flattening where the outer ends of the clavicles should be, and the shoulders, lacking the splinting effect of the clavicles, are unusually mobile and can be approximated or made to touch anteriorly. The deformity does not interfere with the patient's ability to do ordinary work nor does it affect his general health. The abnormality is usually discovered in the course of an examination for another condition. The deciduous teeth may be normal but in the permanent set faulty eruption, impaction, and other abnormalities may be the major source of complaint directly referable to this condition.

Of the 4 cases reported, 1 was sporadic, while the other 3 occurred in members of a single family--a father and his 2 children. The paternal grandfather in this instance had a clubfoot and a deformed hand and the father's brother had a child with a clubfoot. While this may be explained on the basis of coincidence, it nevertheless leaves open the suggestion that the fault in the parental germ-plasm need not necessarily be specific for this complex skeletal abnormality but may, in frustrated forms, find expression in lesser, more localized abnormalities. The entire skeleton in



these patients appeared slightly osteoporotic. The long bones were delicately formed and slender at the shafts and flared out gently toward the extremities.

Cleidocranial dysostosis is a congenital abnormality of the skeletal system particularly involving bone of membranous origin. Although the pathognomonic changes are found in the skull and clavicle and to a lesser extent in the pelvis, the entire skeleton is affected to a greater or less degree. Failure of normal fusion of bones or abnormal fusion may occur. Delayed ossification is common but ossification may be accelerated. (Radiology, July 1953, D. Eisen)

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#### Supervoltage Roentgenotherapy of Esophageal Carcinoma

A total of 58 patients was seen. Nineteen of these were not treated, in most instances because either the lesion was too advanced to expect even temporary sustained palliation, or the general condition was too poor to support such a major procedure. Twelve patients received what the authors would consider grossly inadequate therapy, usually because treatment had to be discontinued because of the rapidly declining general condition.

Twenty-seven patients received what the authors would consider adequate treatment. By this they mean that a minimal dose of 5,000 r, calculated at the level of the esophagus, in about 40 to 45 days, or its equivalent with greater fractionation was delivered.

Five out of twenty-seven adequately treated, or of 39 patients in whom treatment was started, are clinically well today.

Of 29 patients seen more than 5 years ago, 19 were admitted for treatment and 14 of these received adequate therapy. Three of these patients have been clinically and radiographically well, without any sign of active disease with normal esophageal function, for periods of 12, 10, and 8 years, respectively.

Of 22 patients adequately treated but uncontrolled, normal or almost normal esophageal function until death, or until shortly prior to death, was accomplished in 8 instances for periods of between 5 and 25 months. In 6 of these patients death was due to extraesophageal progression of the disease, in 1 to general weakness caused by age, and in 1 probably to massive mediastinal and pulmonary fibrosis.

Analysis of the 22 adequately treated but uncontrolled cases suggests that in only 1 of them surgery may possibly have offered a better chance. (J. Thoracic Surg., July 1953, F. Buschke and S. T. Cantril)

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### The Periodic Physical Examination

Members of the naval service retired for physical disability since 1 October 1949 and placed on the Temporary Disability Retired List are required by law to be examined at 18-month intervals during the period in which their names remain on the Temporary Disability Retired List. Presently about 300 periodic physical examinations are being carried out each month, and it is anticipated that this volume will increase. The purpose of this periodic examination is to determine whether the disability for which the member was retired has remained static, has progressed, or has regressed. Because this examination is quite important in regard to the disposition to be effected in the case of the member concerned, it is imperative that an accurate description of his present status be presented.

It is particularly desired that the report of each such examination contain an adequate presentation of the interval history from the time the member was placed on the Temporary Disability Retired List. This history should include a brief description of the occupational and social adjustment and any other data of this nature pertaining to progression or regression of the disability. Also desired is an accurate report of the current status of the disability (or disabilities) for which retired and any additional disability which may have developed subsequent to retirement. This should include in particular a comprehensive statement of the degree of activity attainable in a certain part or of the degree that function of a part is impaired.

In most instances, the report of interval history and the current physical examination need only be brief; e. g., a general statement as to appearance, habitus, and locomotion where appropriate; the evaluation of muscle tone and function supplied by injured peripheral nerves; the measurement of the degree of function attainable in injured bones or joints; sensitivity of scars or interference of scars with function.

Because of the limited needs to be fulfilled by the periodic physical examination, and because the expense of travel involved in appearing for such examination must be borne by the Navy Department, it has been the policy to utilize the naval activity nearest the place of residence of the retired member for this purpose except that when a more complete study appears necessary the member is ordered to a naval hospital.

In order that the examining medical officer may familiarize himself with the case of a member designated to appear for periodic physical examination, the complete medical record is forwarded in advance. (PQ&MR Div., BuMed)

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The printing of this publication has been approved by the Director of the Bureau of the Budget, June 23, 1952.



Navy Hospital Corpsman  
Awarded Medal of Honor Posthumously

Edward Clyde Benfold, Hospital Corpsman Third Class, USN, of Camden, N. J., was presented the Medal of Honor on July 17, 1953, in ceremonies held at the Naval Shipyard, Philadelphia, Pa.

The Commandant of the Fourth Naval District, Rear Admiral John H. Brown, Jr., presented the posthumous award on behalf of the President and in the name of the Congress to the hero's widow, Mrs. Dorothy Benfold.

Benfold was serving as a Hospital Corpsman with a company of the First Marine Division when his company was subjected to heavy artillery and mortar barrages, followed by a determined assault during darkness by enemy forces estimated at battalion strength. He resolutely moved from position to position in the face of intense hostile fire, treating the wounded and lending words of encouragement.

Leaving the protection of his sheltered position to treat wounded when the platoon area in which he was working was attacked from both the front and rear, Benfold moved forward to an exposed ridge line where he observed two Marines in a large crater. As he approached the two to determine their condition, an enemy soldier threw two grenades into the crater while two other enemy charged the position.

Picking up the two grenades, one in each hand, Benfold leaped out of the crater and hurled himself against the onrushing hostile soldiers. He pushed the grenades against their chests and killed both the attackers.

Mortally wounded while carrying out this heroic act, Benfold, by his unselfish sacrifice in the face of almost certain death, was directly responsible for saving the lives of his two comrades. His exceptional courage reflects the highest credit upon himself and enhances the finest traditions of the United States Naval Service. He gallantly gave his life for others.

Benfold, the fourth Navy man to be awarded the Medal of Honor and the third Hospital Corpsman during the Korean war, was born at Staten Island, N. Y., on January 15, 1931. He entered the naval service at Philadelphia, Pa., on June 27, 1949.

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Annual Medical Military Symposia

Annual medical military symposia are scheduled to convene at the U. S. Naval Hospitals, Chelsea, Mass., on 12 October 1953 and Philadelphia, Pa., on 19 October 1953, respectively.

As in the past, the symposia have been developed and designed to provide medical department officers with the latest information and techniques to be employed in the many phases of naval medicine. The subjects will be



presented by speakers of outstanding prominence in their specialties. Thus, a most interesting and informative program is assured.

These symposia have been approved by the Chief of Naval Personnel for the awarding of retirement point credit to those eligible officers in attendance. Reserve medical officers who desire to attend these symposia should forward their request to the cognizant Commandant at the earliest practicable date. Detailed information may be obtained from the respective District Medical Officers of the First and Fourth Naval Districts. (ResDiv, BuMed)

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#### Dental Correspondence Training Courses

Effective 1 August 1953, the Dental Correspondence Training Division was transferred from the Dental Division, Bureau of Medicine and Surgery, to the U.S. Naval Dental School, National Naval Medical Center, Bethesda, Md. The Dental School will administer the Bureau of Medicine and Surgery correspondence training courses for all officer and enlisted dental personnel of the U.S. Navy and U.S. Naval Reserve.

The correspondence courses, and their promotion and retirement points, are listed in the Catalog of Officer Correspondence Courses, NavPers 10800. All dental personnel who apply for Bureau of Medicine and Surgery correspondence courses should use application form NavPers 992 or an official letter containing the information required by this form. Applications for enrollment should be addressed, via official channels, to:

Commanding Officer  
U.S. Naval Dental School (Code 11)  
National Naval Medical Center  
Bethesda 14, Maryland

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#### Recent Research Reports Issued by U.S. Navy Medical Research Units

Medical Research Laboratory, Naval Submarine Base, New London, Conn.

1. Report of a Survey of the Submarine Medical Allowance and Its Usage. Med. Res. Lab. Report No. 225, 1 June 1953.
2. Comparative Evaluation of Anomaloscopes. NM 003 041.26.01, 18 Aug 1952.
3. A Comparison of Specifications for Dark Adaptation Red. NM 002 014.01.01, 2 Feb 1953.



Naval Medical Field Research Laboratory, Camp Lejeune, N. C.

1. Studies on the Effect of Insecticides on the Oviposition of Anopheles Quadrimaculatus Say. NM 005 052.23.03, June 1953.
2. An Antibacterial Agent From Tribolium castaneum (Herbst). NM 005 052.20.01, June 1953.
3. The Use of Metabolites in the Restoration of the Viability of Heat and Chemically Inactivated E. coli B/r. NM 005 052.27.03, June 1953.
4. The Use of Metabolites for the Reactivation of Bacteria Which Have Been Inactivated by Ultraviolet Irradiation. NM 005 052.27.02, June 1953.

Naval Medical Research Institute, NNMC, Bethesda, Md.

1. Lesions in Swine Induced by Total Body Exposure to Gamma Radiation From an Atomic Bomb Source. NM 006 012.04.60, 26 Feb 1953.
2. Mortality in Swine Exposed to Gamma Radiation From an Atomic Bomb Source. NM 006 012.04.59, 7 Nov 1952.
3. Adsorption on Proteins, the Grand Partition Function and First-Order Phase Changes, According to Approximate Statistical Mechanical Theories. NM 000 018.06.18, 22 May 1953.

Dental Department Research Facility, USNTC, Great Lakes, Ill.

1. Effectiveness of Oral and Peroral Penicillin on Oral Lactobacilli in Humans, NM 008 013.04.08, 1 Mar 1953.
2. A Preliminary Report of a Clinical Evaluation of Analgesic Drugs Used Following Minor Oral Surgery. NM 008 013.09.02, 16 Apr 1953.
3. Results of a 3-year Study of Ulceromembranous Stomatitis (Vincent's Infection). NM 008 013.01, 1 July 1953.
4. A Study of the Relation of a Diet Restricted in Carbohydrates and Oral Lactobacilli Counts With Reference to Reduction of Dental Caries. NM 008 013.07.04, 1 May 1953.
5. Masticatory Function of Partial Denture Cases Among Navy Personnel. NM 008 016.05, 27 May 1953.

U. S. Naval Medical Research Unit No. 3, Cairo, Egypt

1. Mammals From Egypt, The Sudan and Eritrea. I. A New Hedgehog From Africa. NM 005 050.39.10, 1953.
2. Report on a Human Case of Endamoeba Polecki Prowazek 1912. NM 005 050.01.04, 1953.
3. Mammals From Egypt, The Sudan and Eritrea. II. A New Squirrel From the Anglo-Egyptian Sudan. NM 005 050.39.10, 1953.
4. Ticks (Ixodoidea) of the Malagasy Faunal Region (Excepting the Seychelles). The origin and host-relationships; with descriptions of five new Haemaphysalis species. NM 005 050.29.16, 1953.
5. Hybridization Experiments with Culex pipiens and C. quinquefasciatus (Diptera, Culicidae). NM 005 050.30.04, 1953.



From the Note Book

1. A Nation-wide cooperative research effort to evaluate the use of gamma globulin against poliomyelitis has been launched. The program is sponsored by the Public Health Service in collaboration with the Association of State and Territorial Health Officers, the American Physical Therapy Association, and the D. T. Watson School of Physiatics, affiliated with the University of Pittsburgh School of Medicine. An advisory committee comprised of 17 leading polio authorities planned the investigation and will review its progress. The Service's Communicable Disease Center at Atlanta, Ga., will coordinate the program. (P. H. S., Dept. H. E. W.)
2. Reserve credit points may be earned by medical service Reserve officers on inactive duty for attendance at the daily sessions of the forthcoming sixtieth annual meeting of the Association of Military Surgeons. This authorization covers eligible physicians, dentists, veterinarians, nurses, women's medical specialists, and Medical Service Corps officers of the U. S. Army, Navy, and Air Force Reserves. Point credits will be awarded to eligible Reserve officers on the basis of 1 point for each day of attendance, provided sessions attended total more than 2 hours. Each day of the meeting will be considered a session. (OPI, DOD)
3. Volunteers from the enlisted women of the hospital corps will be ordered to fill 63 billets on ships of the Military Sea Transportation Service. Wave hospitalmen and petty officers, other than chief petty officers, may request this duty and state their preference for either the Atlantic or Pacific. The applicants must be 21 years of age and must have to serve at least 24 months. A minimum of 2 enlisted women will be assigned to each ship, and will be assigned only to ships which have a Navy nurse aboard. The tour of duty aboard these ships is 21 months. Of the 63 billets available, 28 are in the Atlantic and 35 are in the Pacific. (OPI, DOD)
4. Within 90 days from 29 June 1953, approximately 250 Naval Reserve Dental officers on active duty in the Priority II category will be eligible for release under the new Doctor-Dentist Draft Act (Public Law 84 of the 83rd Congress). (TIO, BuMed)
5. The answers to a questionnaire received from 65 laryngectomized patients have been tabulated and discussed with emphasis on the many factors influencing the progress and welfare of the patient from the psychologic and emotional standpoint. (Arch. Otolaryng., July 1953, Y. N. Pitkin)
6. Although not altogether a neglected field, the problem of attention to prosthesis in infancy and skillful attention to the cosmetic aspect of limbs for older children has not yet received the attention it deserves. (Am. J. Surg., Aug. 1953, R. F. Chittenden)



7. A statistical study of the 5-year survival rate of 228 consecutive cases of carcinoma of the stomach admitted to 2 hospitals of the Syracuse Medical Center is presented in Cancer, July 1953, A. B. Raffl and G. E. Kelley.

8. A uniform set of rules for reporting cancer end results was recently approved by the American College of Surgeons, the College of American Pathologists, the American College of Radiology, and the American Cancer Society. Representatives from these organizations formed the Joint Committee on Reporting Cancer End Results in 1950 to end what they term the confusion attendant on the lack of uniformity in reporting these results. (Cancer Control Letter, P. H. S., Dept. H. E. W.)

9. An analysis of the complications following cataract extraction occurring in 1,001 cataract operations appears in the American Journal of Ophthalmology, July 1953, A. A. Cinotti and J. H. Jacobson.

10. In a series of cases the figures indicate that concomitant treatment of multivalvular heart disease is within the realm of practicality. The surgical risk is higher than in either mitral or aortic lesions treated as separate entities. (J. Internat. Coll. Surgeons, July 1953, H. E. Bolton, C. P. Bailey, W. L. Jamison, and K. V. S. Rao)

11. Clinical investigative studies on 875 patients with moderately advanced and far advanced pulmonary tuberculosis treated with streptomycin, PAS, amithizone-viomycin, terramycin, and isoniazid alone or in various combinations is presented. (Ann. Int. Med., July 1953, C. W. Tempel, F. W. Pitts, and W. E. Dye)

12. Dietary and therapeutic methods employed by the authors in ulcerative gastric and duodenal conditions are discussed in the American Journal of Digestive Diseases, July 1953, M. B. Levin and B. A. Gwynn.

13. The following medical officers have recently been certified in their specialties by American Boards: LT J. B. Brew (MC) USNR, LT G. F. Egenolf (MC) USNR, and LTJG J. J. Griffin (MC) USNR, American Board of Obstetrics and Gynecology; CDR J. L. Fuelling (MC) USN, LT N. E. Fowler, (MC) USN, and LT L. Schachne (MC) USN, American Board of Ophthalmology; and LT H. Renfert, Jr. (MC) USNR and CDR R. G. Lehman (MC) USNR, American Board of Internal Medicine. (TIO, BuMed)

14. A comparative study of 15 cases of frostbite with major tissue necrosis with an outline of conservative treatment is presented in Annals of Surgery, July 1953, CAPT T. J. Canty (MC) USN and LTJG A. G. Sharf (MC) USN.



BUMED NOTICE 5215

20 July 1953

From: Chief, Bureau of Medicine and Surgery  
To: Ships and Stations Having Medical/Dental Personnel Regularly Assigned

Subj: BuMed directives; cancellation of several

BuMed C/L 50-140 and 51-152 and BuMed Inst. 1301.1 are cancelled.

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BUMED INSTRUCTION 6320.4A

20 July 1953

From: Chief, Bureau of Medicine and Surgery  
To: All Stations Having Medical/Dental Personnel Regularly Assigned

Subj: Hospitalization and subsistence rates for fiscal year 1954

Ref: (a) Art. 21-3, ManMedDept  
(b) Art. 21-33, ManMedDept  
(c) Par. 043123, NavComp Manual  
(d) Par. 41421-1, BuSandA Manual  
(e) Par. 024195, NavComp Manual

This instruction reissues current instructions regarding per diem rates to be collected locally for in-patient medical care and subsistence furnished certain supernumerary patients at naval medical facilities and meal rates to be collected locally for rations sold authorized personnel from naval hospital messes. BuMed Inst. 6320.4 is cancelled.

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BUMED INSTRUCTION 1520.3A

22 July 1953

From: Chief, Bureau of Medicine and Surgery  
Chief of Naval Personnel  
To: All Ships and Stations Having Medical Corps Personnel Regularly Assigned

Subj: Required service agreements for courses of instruction in Aviation Medicine or Submarine and Diving Medicine

Ref: (a) NavPers-15795, List of Navy Schools and Courses



This instruction provides information concerning service agreements required of medical officers making application for assignment to courses of instruction in Aviation Medicine or Submarine and Diving Medicine. BuMed Instruction 1520.3 is cancelled. This revision reduces the required service agreement time for those medical officers completing the course in Submarine and Diving Medicine from 12 months to 9 months following the period of obligated service.

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BUMED INSTRUCTION 7302.2

23 July 1953

From: Chief, Bureau of Medicine and Surgery  
To: All Stations

Subj: Temporary duty travel costs of Army military patients in naval facilities

Ref: (a) Dept. of the Army ltr MEDOC-B 121.2 of 13 July 1953

This instruction is for the guidance of naval facilities transferring Army military patients during fiscal year 1954.

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AVIATION MEDICINE DIVISION



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A New Naval Aviation Selection Test Battery

The cost of producing one new naval aviator has been conservatively estimated at \$65,000. and those selected for training but who fail to complete the program, for one reason or another, represent a loss of \$16,000. per man. Little wonder, then, that the Aviation Medicine Division places so much emphasis on its responsibility for selecting candidates who possess the greatest potential for successfully completing the naval flight training program.

Tests currently in use for selecting flight candidates have been doing a good job of identifying the poor risks for pilot training, but there is always



room for improvement. As the result of continuous research efforts over the past years, a substantially revised Aviation Selection Test battery has now been developed and will be introduced for field use in the very near future. The intent of this announcement is to acquaint those field activities authorized to administer such tests with the major changes in the new and improved test battery.

The number of tests in the revised battery has been increased to four and is divided into two parts. Part I contains one test form that will henceforth be known as the Aviation Qualification Test (AQT), (a revision of the current Aviation Classification Test). While this test continues to be primarily a test of general intelligence, it has been considerably modified to better assess an individual's ability to successfully complete the academic phase of the flight training program, particularly in such subjects as navigation, aerology, and principles of flight. Applicants who fail to attain the minimum qualifying score on the AQT will be rejected with greater assurance that they would have real difficulty in learning subject matter essential to naval flight training.

Part 2 of the revised battery consists of three tests. Scores made on these tests are combined to determine an applicant's Flight Aptitude Rating (FAR). These three tests are as follows:

(a) Mechanical Comprehension Test (MCT). -- This is the only current test being retained in its present form. Research studies disclose that the MCT continues to provide something unique by way of discriminating between the "have" and "have nots" for the flight phase of the training program.

(b) Spatial Apperception Test (SAT). -- The SAT is a new addition to the FAR battery and introduces another factor that has been found to be related to success in flight training--the ability of the individual to orient himself in space. Specifically, this test has been designed to measure the ability to visualize the relationship between a plane and the territory over which it flies.

(c) Biographical Inventory (BI). -- The new BI has been extensively revised with a view toward predicting attrition in aviation training that is primarily related to motivational factors. More emphasis has been placed on informational type items than was true in the old form, but again the major contribution of the BI will be in terms of patterns of response rather than upon single items.

Scores made on the three tests in Part 2 will be combined into a single index to determine a candidate's Flight Aptitude Rating. In order that each test may be appropriately weighed in computing the FAR, tables have been prepared for translating raw scores into converted scores in determining the FAR index. Complete instructions for this operation have been prepared and will be distributed in those activities authorized to score tests locally. At the present time, only those naval air stations and naval air reserve training units under the cognizance of the Chief of Naval Air Reserve Training are so authorized. All other stations and activities with authority to



administer the selection battery will continue to forward the test answer sheets to the Bureau of Medicine and Surgery for scoring.

One very important change in the revised battery is the procedure for representing test scores. Previously, scores made on the ACT, MCT, and FAR, were translated into an alphabetical symbol with minus signs used to indicate gradations in probability of success (A, A-, B, B-, C, C-, D, D-, and E). All too frequently this system has been directly responsible for errors in transmitting and interpreting scores made on the tests. In order to eliminate the possibility of such errors in the future, a numerical system of scores will now be used. Under the new system scores will range from 9 through 1 with 9 being the highest rating (comparable to the letter A) and 1 being the lowest rating (comparable to the letter E). It will be necessary for applicants to attain at least a minimum qualifying score of 3 on both the AQT and FAR in order to be accepted for flight training.

Another important change, for those activities authorized to score tests locally, is the requirement for scoring the AQT prior to the administration of Part 2 of the selection battery. Applicants who fail to attain the minimum qualifying score on the AQT will be immediately eliminated from further consideration and are not to be given Part 2. This provision will reduce the amount of unnecessary testing. However, all activities not authorized to score tests locally will administer both Part I and Part 2 and forward answer sheets to the Bureau for scoring.

The distribution of the test battery and other materials is limited to those ships and stations whose complement includes a flight surgeon or aviation medical examiner. This officer is directly responsible for the security, administration, and scoring (where authorized) of the naval aviation selection tests and is expected to take personal charge in fulfilling these responsibilities. On those occasions where other duties absolutely prevent his conduct of the actual testing, this responsibility may be delegated only to a Hospital Corpsman, Aviation Technician, or Yeoman who has been specially elected and trained by him for such duties.

The procedures for administering and scoring the revised battery differ considerably from current methods. Special attention and care must be given to becoming thoroughly familiar with the contents of the new instructional manuals. It can be anticipated that all such materials will be forwarded several weeks in advance of the effective date of the new battery.

The process of developing a new and improved aviation selection test battery has been a long one but there is every reason to believe that the effort has been most worth while and that real savings to the Navy can be effected if properly utilized. This depends to a large degree on the flight surgeon in the field. It does not do any good to have a fine precision instrument, such as the phorometer, for measuring and determining ocular muscle balance if the principles for its use are ignored. The same applies to the aviation selection battery. It is essential that the procedures outlined



for administering and scoring the tests be followed exactly as they are prepared. Any deviation from the prescribed instructions means that the tests will not have been used fairly and impartially. The most important function of uniform instructions is to insure that every applicant, regardless of where he applies, will have the same opportunity to demonstrate his qualification for naval flight training and that he will not be penalized or given extra assistance by small deviations from the established examining procedures. Remember, the average cost to the Navy for every individual who is accepted and must later be dropped from flight training represents a loss of \$16,000.

(NOTE. --In conducting the flight physical examination, of which the administration of the aviation selection tests is a part, the most frequent factor responsible for rejection is the inability of the applicant to meet the visual standards. The second most frequent factor is the failure of the applicant to pass the selection tests. Therefore, in the interest of efficient utilization of time and personnel, the following order of procedure in the examination of flight applicants is suggested: (1) Check the applicant for color vision and visual acuity. (2) Should the applicant's color vision be normal and his visual acuity meet the standard requirements, administer the aviation selection tests. (3) Complete the flight physical examination.)

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#### Demonstrations of Vertigo for Student Naval Aviators

Vertigo is a fairly common experience in night flying, but it is easy on many and difficult for only a few. Nevertheless, it is important for student naval aviators to realize that they will all experience some degree of vertigo at various times in their flying career. They should also understand that these effects are "normal" and need not be a serious handicap to flight if the proper procedures are followed. Although the frequency and severity of vertigo will differ with individuals, both in flying and in the following demonstrations using the Barany chair, the demonstrations can be used to show types of illusory effects in spatial orientation during rotation. The demonstrations are: (1) A demonstration of the fact that during constant rotation the sensation of turning tends to disappear. (2) A demonstration that when a person slows down following a constant turn, he feels either that he has stopped or that he is turning in the opposite direction. (3) A demonstration of the fact that when rotation ceases suddenly, the person has an illusory sensation of rotation in the opposite direction of the previous turn. (4) A demonstration of Coriolis effects which result from an active movement of the head made in a plane at right angles to the plane of rotation. These head movements may cause illusory feelings comparable to climbing or diving in an aircraft.

It should be noted that these illusory effects are most pronounced after the person has rotated at a relatively constant rate of speed for some period



of time. The point that these situations are reproduced in actual flying should be made throughout the demonstration and the following discussion. Under ordinary circumstances on the ground, turning is usually of very brief duration so that these rotational effects are rarely or never experienced. However, in Barany chairs and airplanes a person may turn at a fairly constant rate for a prolonged period of time and is, therefore, susceptible to a series of illusions of the sort demonstrated. A relatively rapid rate of rotation is used in the Barany chair for purposes of easy demonstration of these illusory effects, but experimental flights in SNJ aircraft carried on by the U. S. Naval School of Aviation Medicine have shown that such illusions may occur during normal turns in aircraft during flight.

The procedure used in giving these demonstrations is to seat the subject with his head erect in the Barany chair, being sure that the safety bar across the front is securely fastened. If it is possible for him to get any cues regarding his rotation from bright lights or windows, he should be blindfolded. Otherwise, he is merely asked to close his eyes and keep them closed throughout the demonstration. The pedal on the Barany chair is then depressed to permit the chair to be rotated freely. The subject is instructed to report his feelings of rotation throughout the demonstration, particularly when he notices a change in rate of turn, when he notices that he has stopped, or when he notices that he is turning in the opposite direction. He should be urged to give his full cooperation in the demonstration and not to try to guess what response he should make. Rather, he should relax and accept any feelings that occur even though he may know or suspect that these do not correspond with what he thinks is actually happening at the time. He should report spontaneously at regular intervals throughout each demonstration.

Demonstration No. 1. In this demonstration the subject is rotated to the right at 20 rpm. The subject will immediately report correctly that he is turning to the right. He will subsequently report that he is slowing down. If the rotation is smooth enough, he may even report that he has stopped completely. This demonstration will show that the sensation of rotation is present when a turn begins (that is, immediately following angular acceleration), but this sensation is reduced or disappears when a constant velocity of turn is maintained. In an airplane this would mean that the person may be very sensitive to an immediate change in the direction of flight, but when a constant speed turn is maintained, he will have no sensation to tell him that the turn is continuing.

Demonstration No. 2. The procedure in this demonstration is the same as in demonstration number 1, but after the subject has been rotated for 30 seconds, the rate of rotation is abruptly slowed to approximately 5 rpm. He will report immediately that he has either stopped or is turning to the left, when actually he is turning to the right. For the class as a whole, this makes a rather convincing demonstration of the fact that an



individual may be just  $180^{\circ}$  wrong in judging the direction of rotation. After about 20 seconds, the speed of rotation should be increased again to 20 rpm and the subject will report that he is turning in the correct direction once more. Some variation on this can be made by speeding up and slowing down the rotation with short intervals of 10 or 15 seconds of constant rotation. In these intervals the subject will report such things as correct judgment of turn, that he is stopped when he is turning, or that he is turning in the opposite direction from the true direction of rotation. This demonstration is effective in showing clearly that the subject may be right part of the time and wrong part of the time in his sensations of rotation. It is easy to make the point that because one's sensations may be right or wrong, one cannot possibly trust them during flight.

Demonstration No. 3. This demonstration is performed by rotating the subject for 30 seconds at 20 rpm and then stopping abruptly by releasing the foot brake or by stopping him with the hands. If he was turning to the right he will immediately report that he is turning to the left. This is called the first effect. If he is asked to elaborate, he will probably say that he is turning fairly rapidly. Subsequently, he will report that he is slowing down and at the end of 20 to 30 seconds he will report that he has stopped. Be sure to have the subject remain seated and continue to report for some time after he feels that he has stopped turning, because some subjects will subsequently report that they are turning to the left again. This sensation is called the second effect. Some subjects may have a third or fourth effect in alternate directions, but this is probably not worth time in the demonstration because the sensations are not very pronounced. This demonstration will show that after an individual has assumed straight and level flight after a turn, he may have a series of false sensations of turning for a considerable number of seconds afterward.

Demonstration No. 4. This demonstration is designed to show that when the head is moved around during rotation, unusual sensations may occur. The subject is rotated as in demonstration number 1 with the head erect for 30 seconds. He is then instructed for the first part of the demonstration to place his head firmly on his right shoulder; the head movement should be practiced before the rotation begins so that he will be sure to get his head well over to the right. He should be warned to keep his hands on the arms of the chair so that he can steady himself. He will then report that he is in a steep climbing or diving turn in a direction which is dependent upon the direction of the turn and the direction of head movement. While the rotation continues, he should then be asked to return his head to the upright position and even stronger sensations may result. It should be noted that some individuals tend to react rather strongly to this sort of demonstration and it is, therefore, wise to permit them to sit quietly with the eyes closed for 15 or 20 seconds after the demonstration has been completed. A second part of this demonstration is made by having the subject lean his head well forward with chin on chest following 20 to 30 seconds of constant rotation. As the



rotation continues, he will report sensations which are of the same sort as described in the first part of this demonstration. This demonstration can be used to show that misleading sensations may be experienced by pilots during a turn when they lean forward in the cockpit with their head down to reach for a control lever or something low in the cockpit.

The general aim of these demonstrations is to show that the flyer's feelings of turning either may or may not fit the facts. The semicircular canals, which are part of the inner ear and are not used in hearing, are important in causing these effects which are to be considered perfectly normal. On the ground the semicircular canals operate very efficiently to tell you when you are turning. But in the air during and after prolonged turns, and following sudden changes in flight, this organ sends out a lot of bad information. It may say, "Straight and level," when the individual is really in a turn, or it may say, "Turn," when the individual is straight and level. A perfectly normal inner ear may work fine on the ground, but in the air it may produce vertigo. Therefore, it is important for student naval aviators to know about these effects so that they may know what to expect and realize the necessity of absolute reliance on instruments. (CDR B. Clark (MSC) USNR and LTJG M. A. Nicholson (MSC) USNR, USNavSchAvMed, NAS, Pensacola, Fla.)

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Book Review of  
"Human Factors in Air Transportation"  
by  
Ross A. McFarland, Ph. D.

Doctor McFarland has combined his vast personal knowledge and practical experience in the fields of air transportation and public health with a prodigious amount of delving into a wide variety of source material to produce a most complete and significant volume dealing with the human factors in air transportation.

In this book, a wide range of information from the various biologic and engineering sciences has been integrated with the specific problems of aviation medicine and flight safety. Doctor McFarland has analyzed the problems of health and safety in aviation from an international point of view and demonstrates that the prevention of disease and disability is an international problem that must be handled on a global basis.

The opening chapters deal with the application of modern psychological and medical tests and procedures to the selection, maintenance, and training of air crews. A close relationship is demonstrated between the skill and personal fitness of those who operate the equipment and the safety of the plane and its occupants. Frequent and thorough health inventories of airmen



are recommended, and numerous cases are cited to show the value of this practice. Considerable attention is devoted to a better understanding of the aircraft environment and the limitations imposed on human performance especially by the adverse effects of high altitude and high-speed flight, extremes of cabin atmosphere, and the functional limitations of the sense organs. As a further means of improving safety, the various ways in which improper diet, overindulgence in stimulants, lack of exercise, and emotional maladjustments may affect aircrew performance are elaborated. Particular emphasis is placed on preventing operational fatigue in the air crews, in understanding the deterioration in skill which may come with age, and in prolonging the useful services of highly trained and experienced employees.

The selection, placement, and health maintenance of ground employees are stressed because of the intimate relationship between safety on the ground and in flight. The discussion includes the control of accidents and hazardous exposures in the shops, hangars, and ramps because of the high injury rates in these areas. Survival and rescue procedures are treated extensively in connection with the far-flung nature of airline operations over water, arctic, desert, and heavily forested areas as well as in the vicinity of airports where accidents occur most frequently. All aspects of sanitation are considered in relation to the design, location, and operation of airports and the speed with which contagious diseases might be spread from one area to another. The care and contentment of passengers and the transportation of patients by air are given special consideration. While new design features such as cabin pressurization and jet propulsion have increased the comfort of air travel, they have also created new problems and suggestions for the solution are made.

The basic objective of this book is to stress the importance of coordinating the technical progress in air transportation, and the economic benefits of increased speed, payload, and efficiency with the human limitations of the air and ground crews and the interests and needs of the air-traveling public.

There are a large number of graphs, tables, and statistics in the book. Each chapter is followed by a large selected bibliography. An appendix contains abbreviations of official titles of companies and organizations and for scientific and engineering terms. A complete index closes the book.

This book is a most complete and detailed study of aviation medicine and flight safety in the broadest scope and is equally applicable to both civil and military air operations.

This volume is an excellent reference piece and should prove to be an invaluable source of practical information for those in the field of aviation medicine. (CDR F. B. Voris (MC) USN)

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Defects Noted on SF-88's Submitted to BuMed:June and July 1953

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Excess Copies .....	968
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Carbon copies not legible .....	444
Carelessness in recording results .....	147
Item No. 17 omitted .....	287
Not fully explaining dental defects of NavCad applicants .....	12
Refractions not properly recorded .....	4
Failure to state aviator's service group in recommendation .....	63
No reason given for hospitalization .....	3
Not clarifying or going into enough detail regarding medical defects .....	11
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